

E665: μXe 490x0 GeV

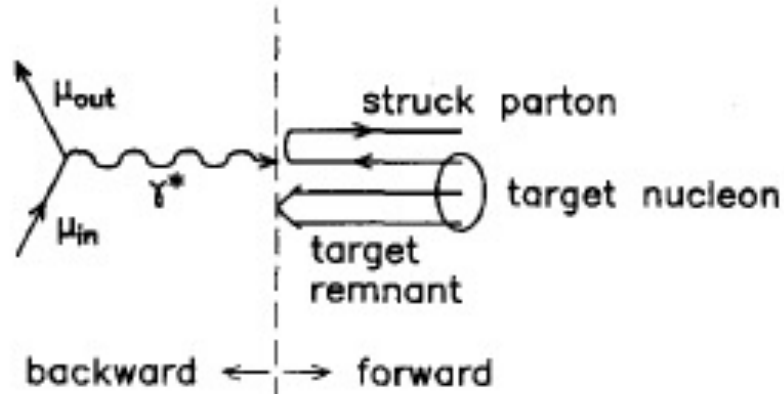


Fig. 1. Deep-inelastic muon-nucleon scattering in the quark-parton model, as viewed in the hadronic center-of-mass system

$\mu^+\text{Xe}$ 490x0 GeV 40K events

Kinematic cuts:

$$0.1 < y < 0.85$$

$$1.0 < Q^2 < 100$$

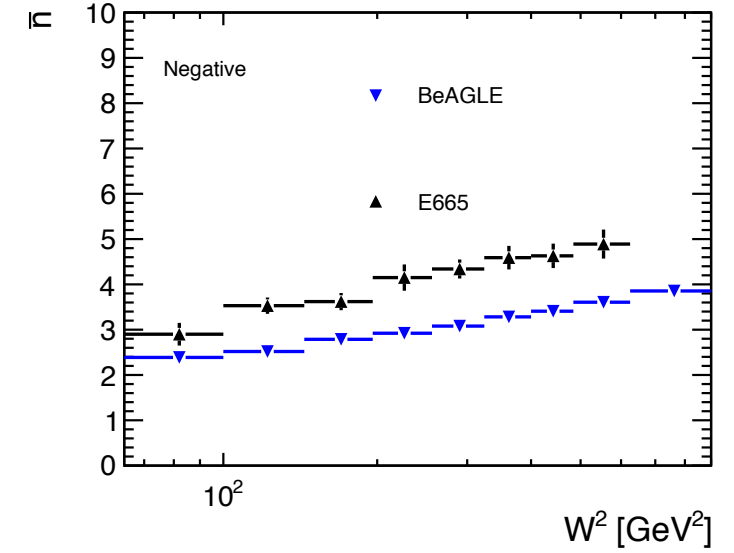
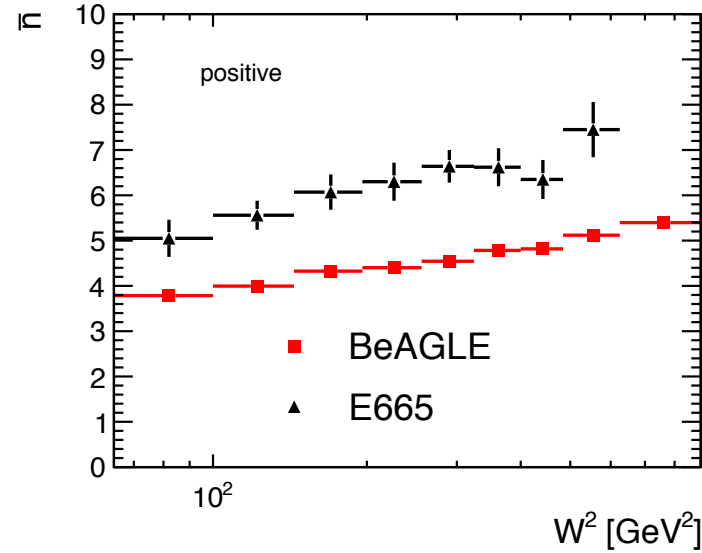
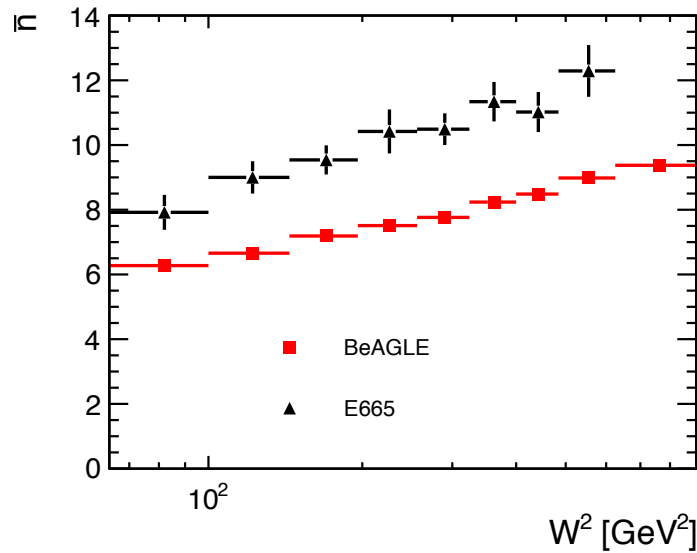
$$0.0035 \text{ rad} < \theta < 6.29 \text{ rad}$$

$$8 < W < 30 \text{ GeV}$$

$$X > 0.002$$

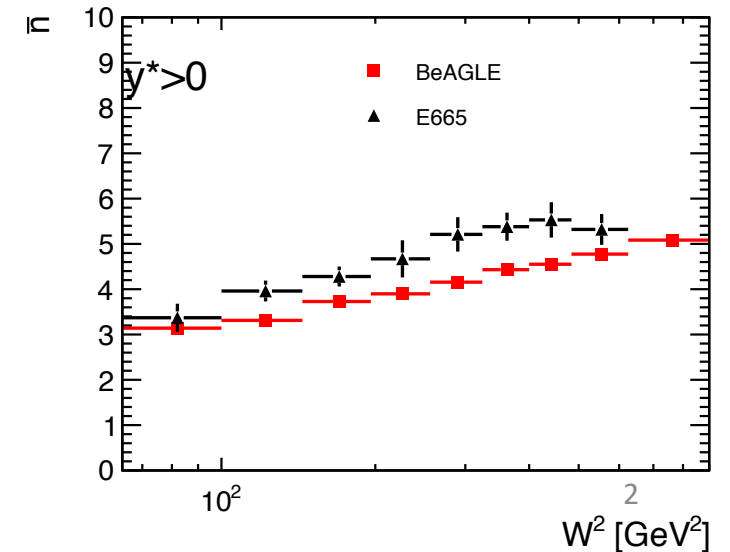
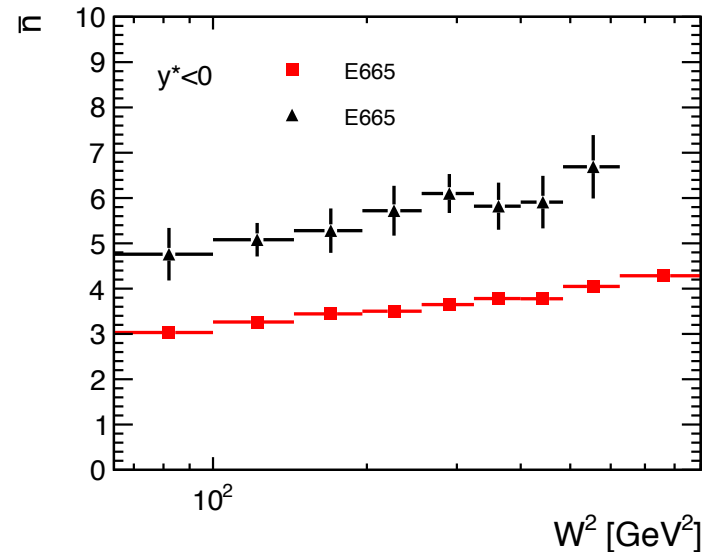
The struck parton is emitted into the forward direction, while the target remnant travels into the backward direction. The hadronic CMS frame is defined by the system formed by the **virtual photon** and the **target nucleon**.

Multiplicity distribution



With the latest version
of BeAGLE

$\tau_0 = 10 \text{ fm}$



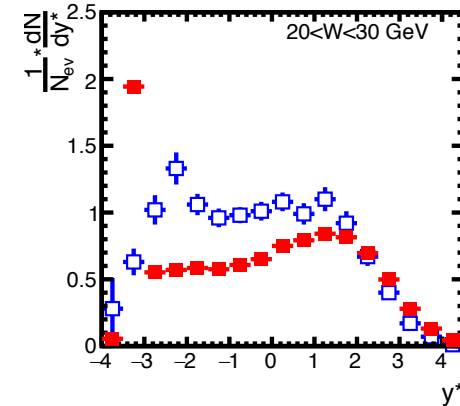
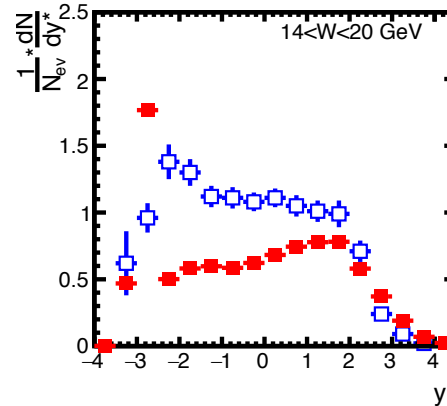
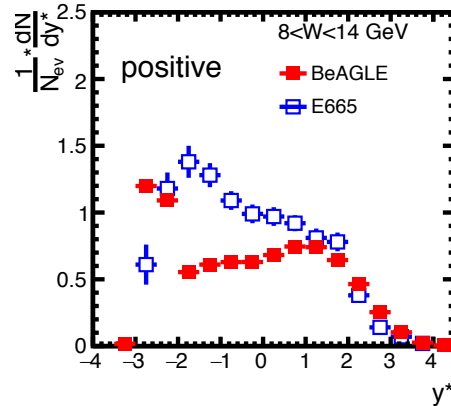
Normalized cms-rapidity distribution

$8 < W < 14 \text{ GeV}$

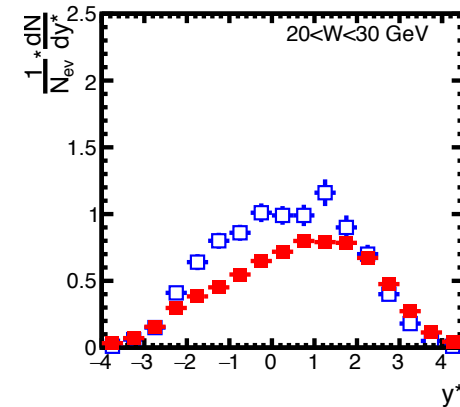
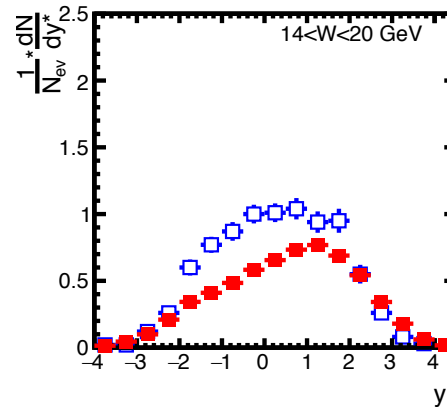
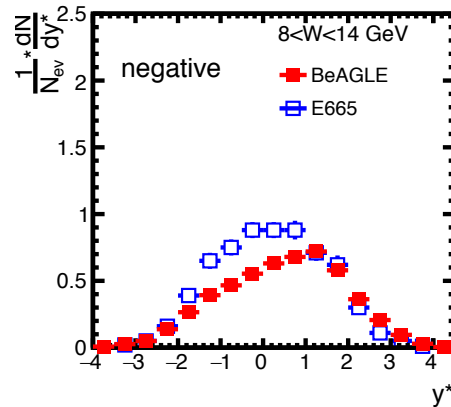
$14 < W < 20 \text{ GeV}$

$20 < W < 30 \text{ GeV}$

Positive



Negative



- The distributions for both positive and negative hadrons in forward are agree with E665.
- There is no τ_0 dependence for positive hadrons in forward.
- There is no τ_0 dependence for negative hadrons.

To do...

- BeAGLE vs. E665
 - [Kinematics distribution](#)
 - [muD cms-rapidity distribution](#)
 - [Normalized cms-rapidity distribution of the hadronic net charge for muD and muXe scattering](#)
 - [Difference of the normalized cms-rapidity distributions between muXe and muD scattering, with different tau0.](#)
- BeAGLE vs. ZEUS
 - [The \$p_T^2\$ -slope, b vs. \$x_L\$](#)
 - [The leading proton production rate, \$1/\sigma_{inc} \cdot d\sigma_{LP}/dx_L\$](#)
- Centrality determination
 - The result has been done two years ago, and have been collected in the draft of general BeAGLE paper. (<https://www.overleaf.com/project/5dc81e78a918250001263171>). The plots need to be updated by the latest version of BeAGLE and latest parameters

Old results

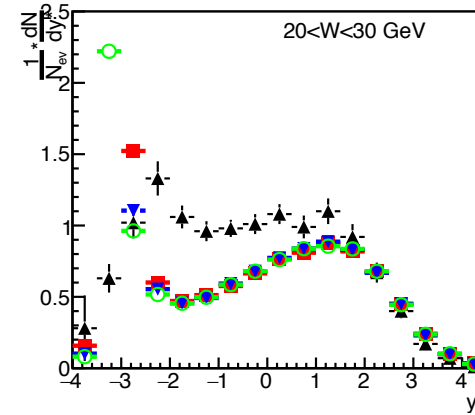
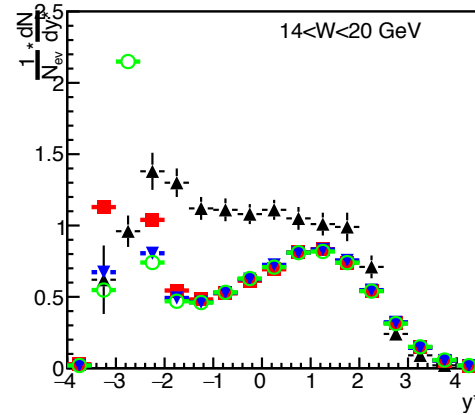
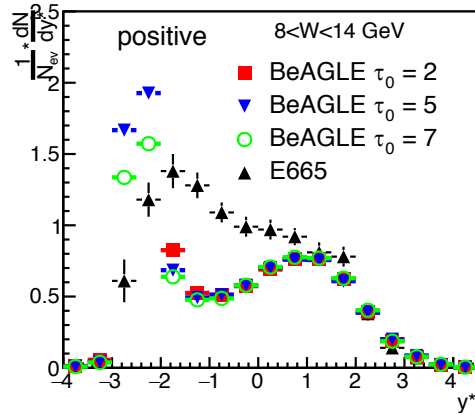
Normalized cms-rapidity distribution

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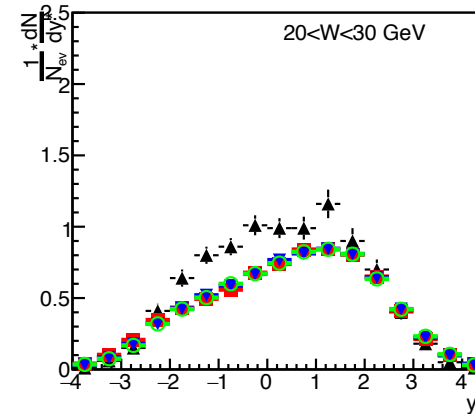
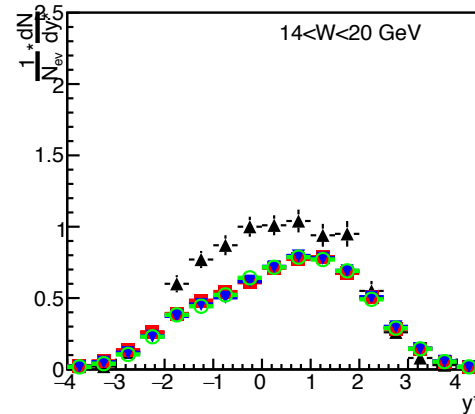
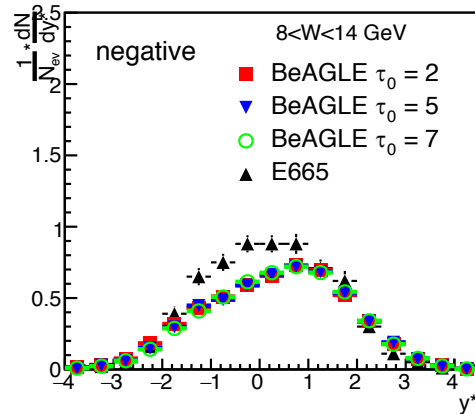
$14 < W < 20 \text{ GeV}$

$20 < W < 30 \text{ GeV}$

Positive

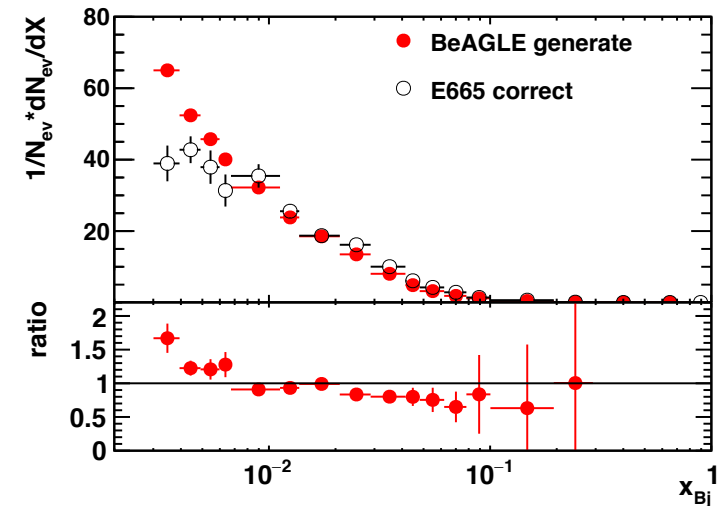
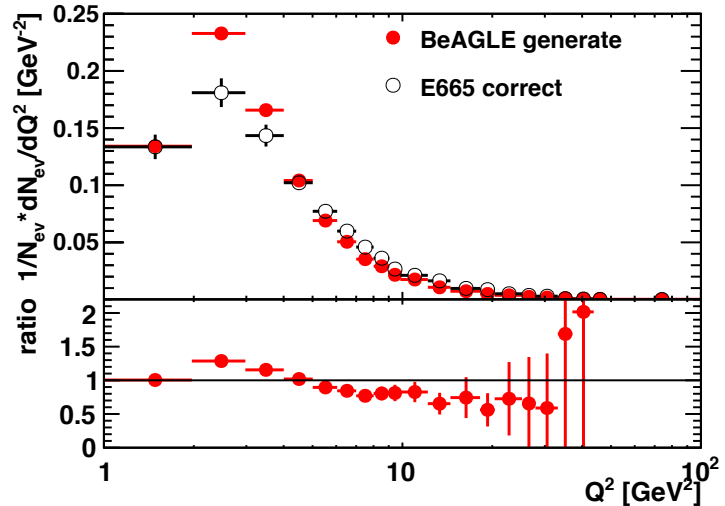
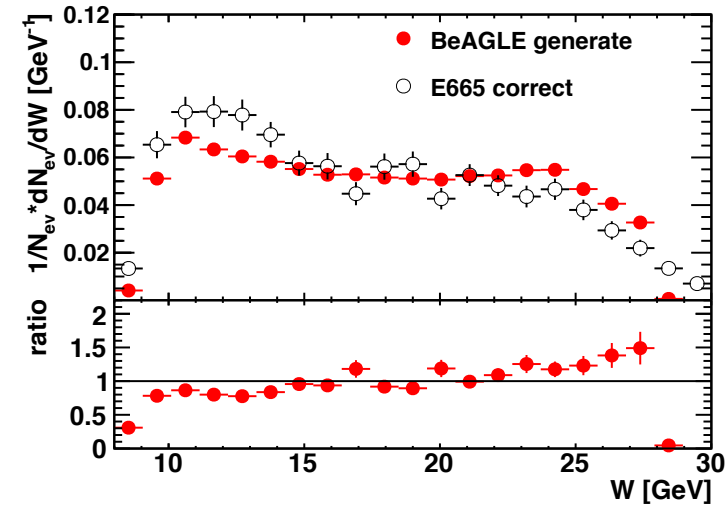
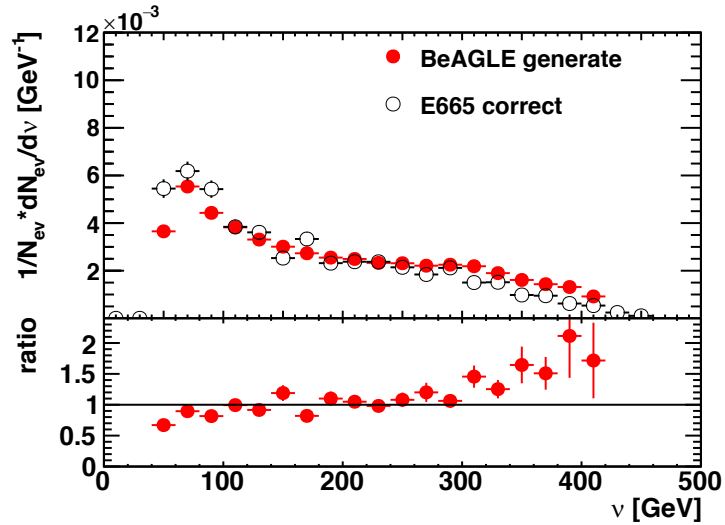


Negative



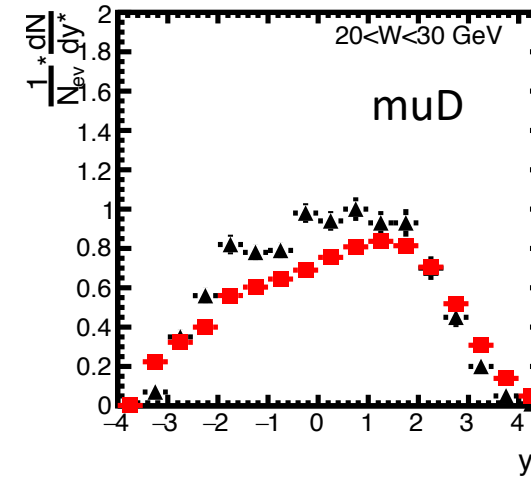
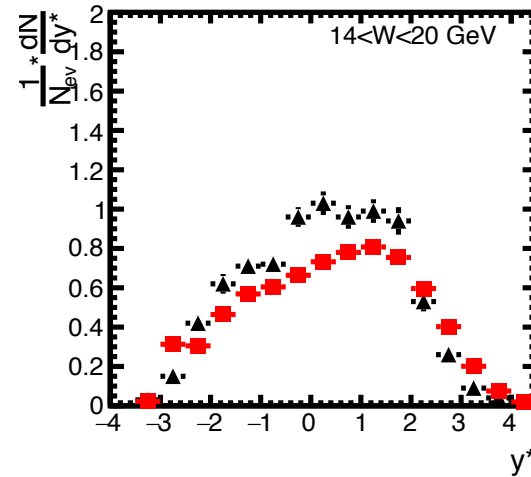
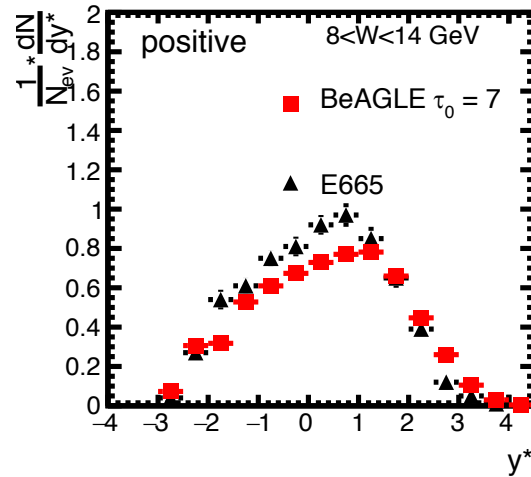
- There is no τ_0 dependence for positive hadrons in forward.
- There is no τ_0 dependence for negative hadrons.
- The distributions for both positive and negative hadrons in forward agree with E665.

Kinematics distribution

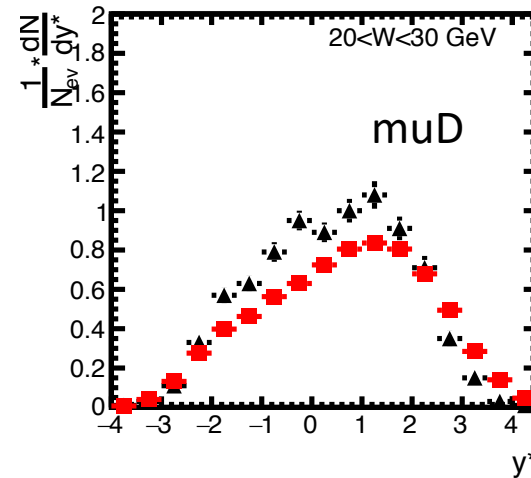
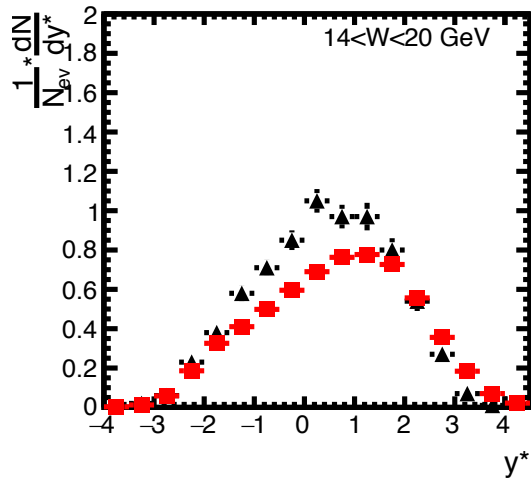
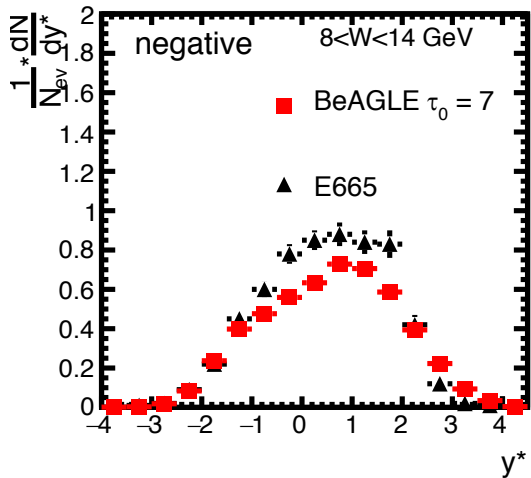


muD y^* distribution

Normalized cms-rapidity distribution for muD:

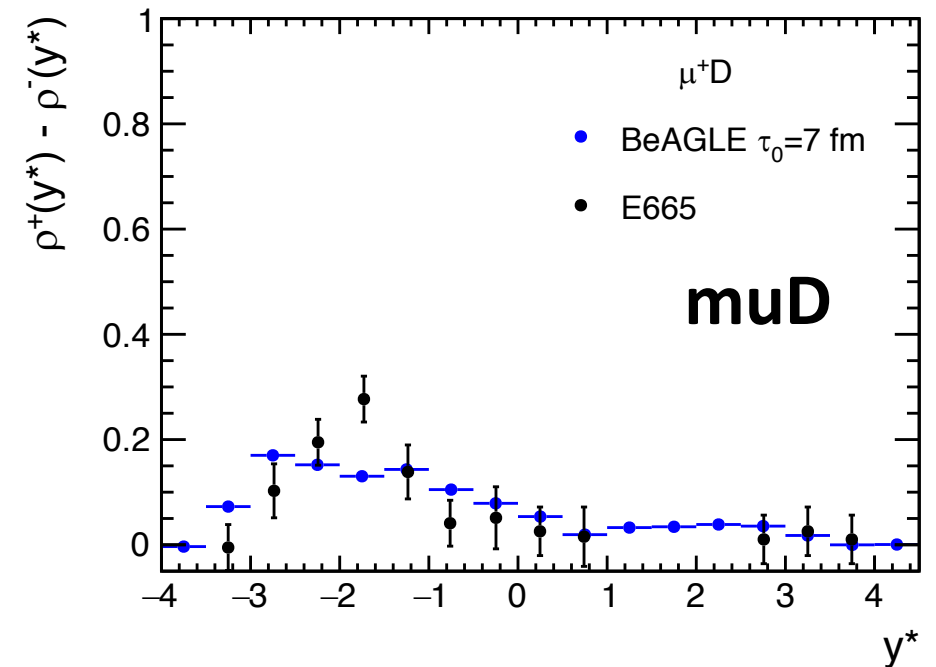
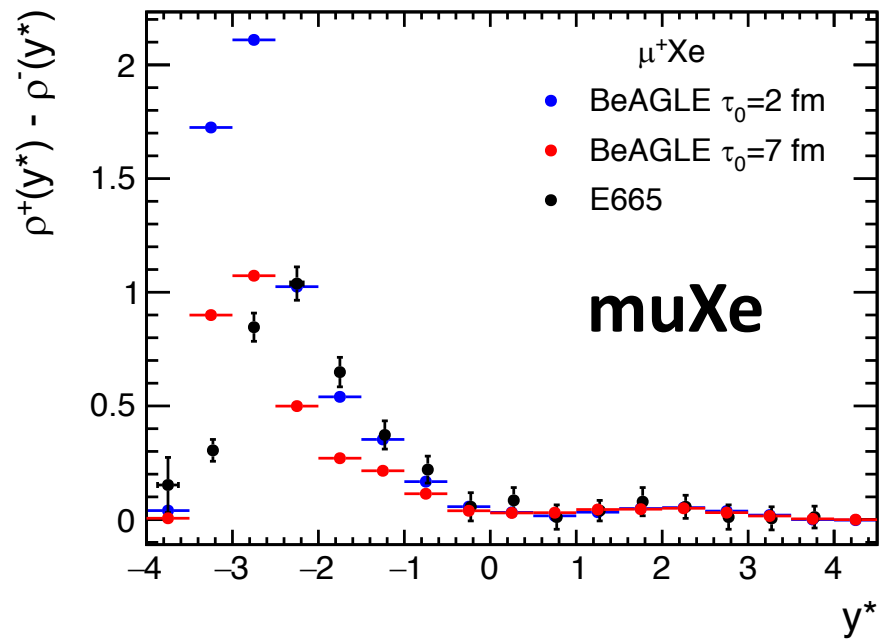


$\tau_0 = 7$ fm



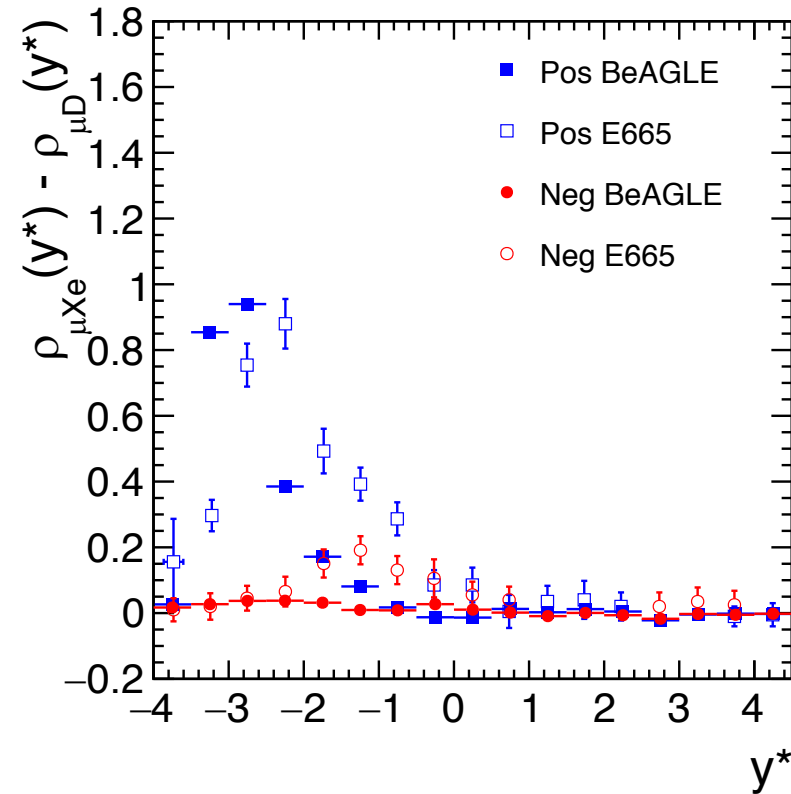
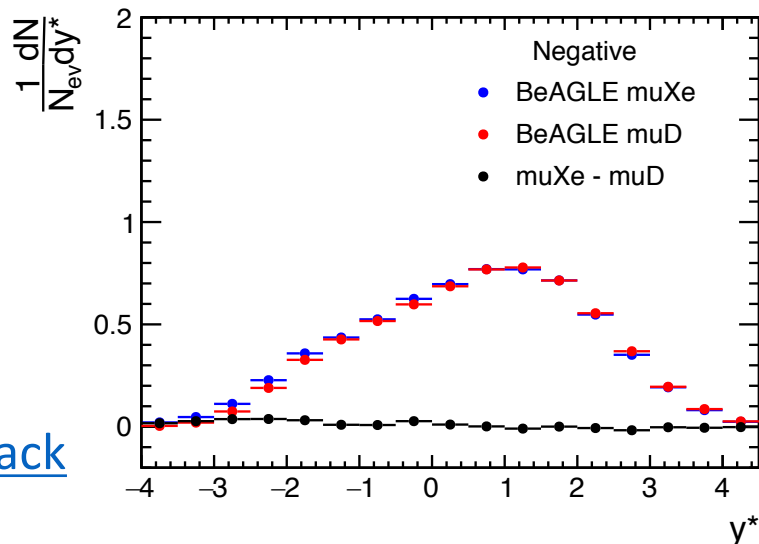
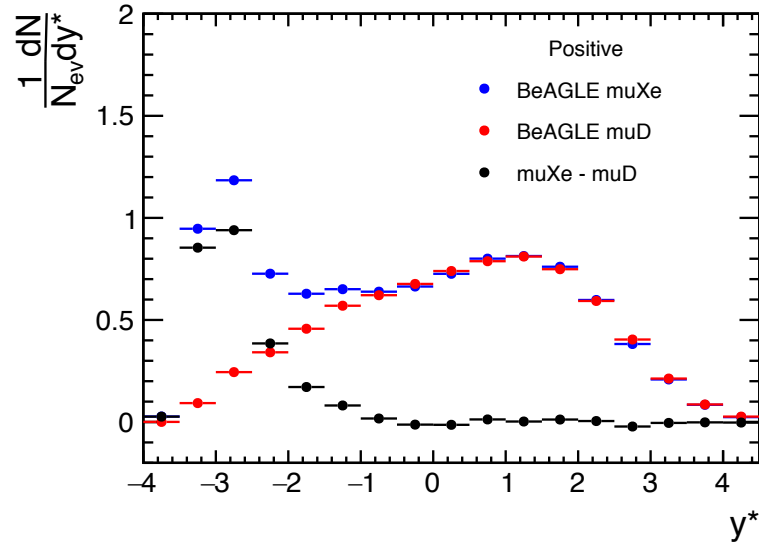
hadronic net charge

Normalized cms-rapidity distribution of the hadronic net charge for muD and muXe scattering:



Difference of the normalized cms-rapidity distributions

Difference of the normalized cms-rapidity distributions between muXe and muD scattering, for positive and negative hadrons:

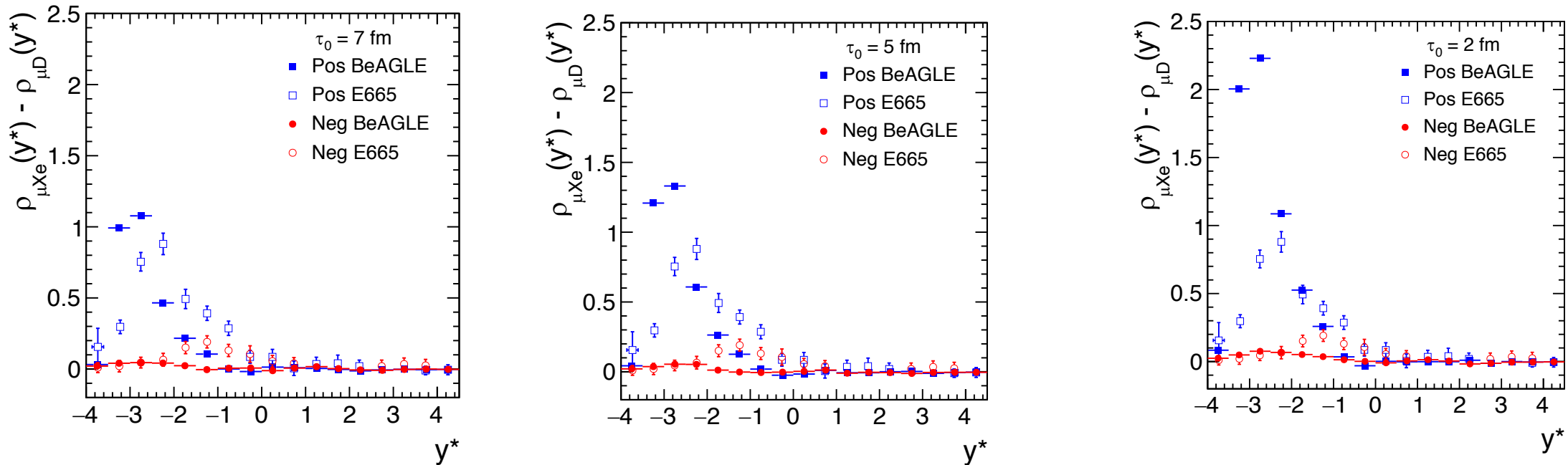


For muXe and muD, tau0 = 7.

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$$\rho_{\mu Xe}(y^*) - \rho_{\mu D}(y^*)$$

Difference of the normalized cms-rapidity distributions between muXe and muD scattering, for positive (blue) and negative hadrons (red) with different tau0:

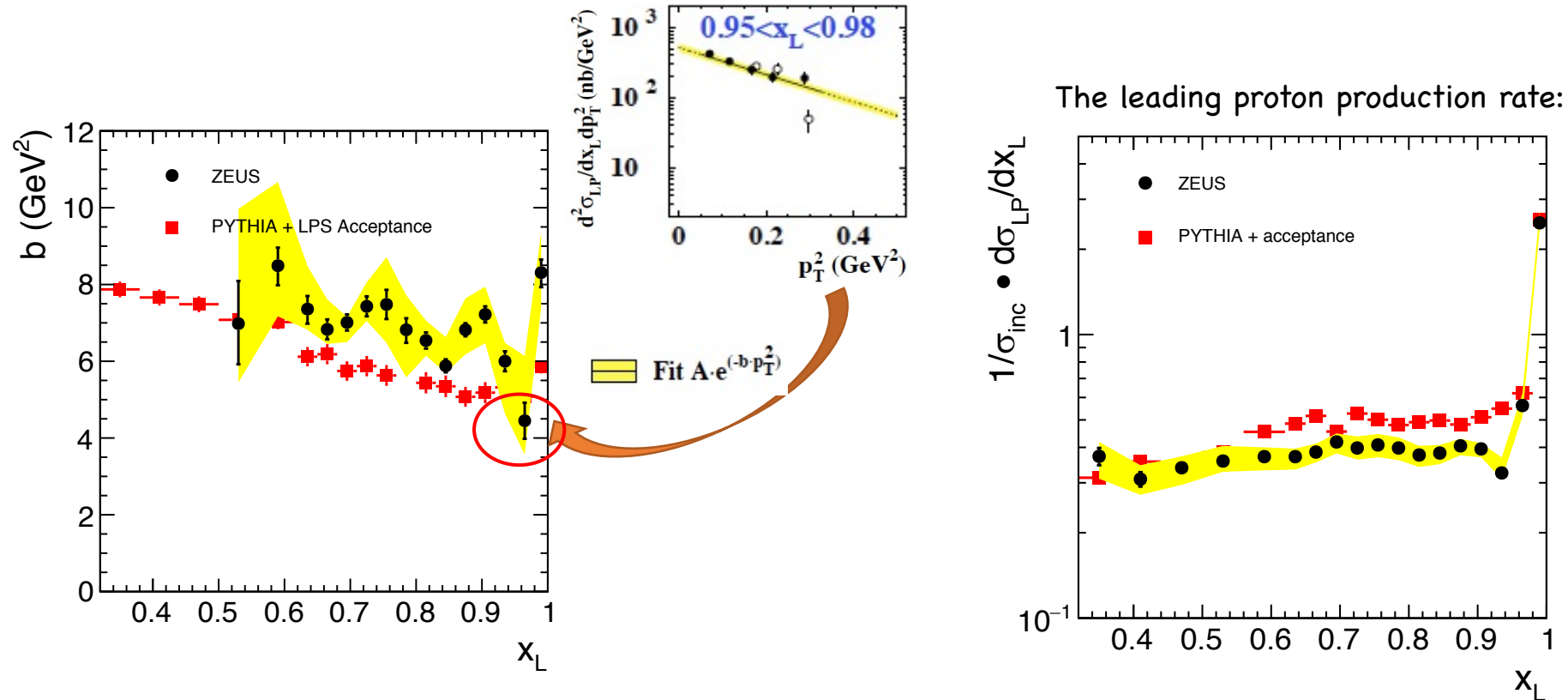


It doesn't agree very well in backward.

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PYTHIA tune for ZEUS e+p

LPS trigger conditions and acceptance were required, dropped tracks very close to beamline or the edge of LPS detectors.



We have a good PYTHIA tune for target fragmentation for ep.

Remaining improvement would require a full GEANT simulation

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